DOCUMENT RESUME

ED 383 771 TM 023 325

AUTHOR Garcia, Teresa; And Others
TITLE Worriers and Procrastinators: Differences in Motivation, Cognitive Engagement, and Achievement between Defensive Pessimists and Self-Handicappers.
SPONS AGENCY Texas Univ., Austin.
PUB DATE Apr 95
NOTE 13p.; Paper presented at the Annual Meeting of the American Educational Research Association (San Francisco, CA, April 18-22, 1995).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Academic Achievement; *Affective Behavior; *Anxiety; *College Students; Defense Mechanisms; Goal Orientation; Higher Education; *Learning Strategies; Models; *Student Motivation
IDENTIFIERS Cognitive Engagement; Pessimism; *Procrastination; Self Handicapping; *Self Regulated Learning; Worry

ABSTRACT

The role of affect in self-regulated learning was explored, focusing on the effects of two motivational strategies, defensive pessimism and self-handicapping, on the motivational outlook of college students (n=126), use of learning strategies, and performance. It was found that these strategies, which are used to regulate the affective outcomes related to evaluation, did indeed influence motivation, use of learning strategies, and performance. Students who differed in levels of motivational strategies differed in levels of motivation and in cognitive, metacognitive, and resource management strategies. Results suggest that affect is an important aspect of self-regulated learning and that models of self-regulation need to take affective concerns into account in order to address the complex and multifaceted nature of self-regulated learning. Four tables present study findings. (Contains 31 references.) (SLD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 383 771

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Teresa Garcia
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

Worriers and procrastinators: Differences in motivation, cognitive engagement, and achievement between defensive pessimists and self-handicappers

Teresa Garcia,

Judy S. Matula,

Cheryl L. Harris,

Katherine Egan-Dowdy,

Maria R. Lissi,

Consuelo Davila

University of Texas at Austin

Presented at a paper session, "Developmental changes in goal orientation and motivation" at the annual meeting of the American Educational Research Association, San Francisco, CA, April 1995. This research was supported by a Faculty Incentive Grant and a Summer Research Award from the University of Texas at Austin awarded to the first author. Please address all correspondence to: Teresa Garcia, Department of Educational Psychology, SZB 504, University of Texas at Austin, Austin, TX 78712. Opinions expressed in this paper are those of the authors and not of the University of Texas at Austin.

TM023325

BEST COPY AVAILABLE

Abstract

The goal of this study was to explore the role of affect in self-regulated learning: specifically, we examined the effects of two motivational strategies, defensive pessimism and self-handicapping on college students' (n = 126) motivational outlook, use of learning strategies, and performance. We found that these strategies, which are used to regulate the affective outcomes related to evaluation, did indeed impact upon students' motivation, use of learning strategies, and performance. Our results suggest that affect is an important aspect of self-regulated learning, and that our models of self-regulation need to take into account affective concerns in order to fully address the complex and multifaceted nature of self-regulated learning.

Worriers and procrastinators: Differences in motivation, cognitive engagement, and achievement between defensive pessimists and self-handicappers

Research on self-regulated learning has typically emphasized students' use of cognitive, metacognitive, and resource management strategies to regulate the encoding and processing of information, and how the use of these strategies is related to motivational factors such as goal orientation, self-efficacy, and anxiety (e.g., Zimmerman & Schunk, 1989). The goal of this paper is to explore the role of affect in self-regulated learning. More specifically, we wish to highlight the role of motivational strategies in self-regulated learning, and to discuss how affective concerns may moderate the quality of self-regulated learning students demonstrate.

Motivational strategies can be defined as thoughts and behaviors which are used to regulate the affective outcomes related to evaluation (Garcia, in press; Garcia & Pintrich, 1994; cf. Weinstein & Mayer, 1986). Schooling is intricately tied to performance, and it is a simple fact that performance evaluations carry affective consequences (Covington, 1992; Covington & Beery, 1976; Nicholls, 1989). Motivational strategies such as defensive pessimism and self-handicapping are two means for negotiating affectively "risky" events; these motivational strategies may in turn impact upon students' motivational outlook and cognitive engagement (Garcia & Pintrich, 1993; 1994).

Defensive pessimism involves setting unrealistically low expectations prior to an evaluative situation, resulting in anxiety which provides the impetus for greater levels of effort (Garcia & Pintrich, 1994; Norem & Cantor, 1986). In effect, this strategy harnesses anxiety to two beneficial ends. First, the low expectations allow the individual to "play through" a potentially negative outcome; this thinking-through process is a way to acknowledge one's apprehensions and to cognitively work through them, effectively "steeling" the individual for a possible failure (Norem & Cantor, 1986; Norem & Illingworth, 1993). Second, since the low expectations are paired with an increase in effort, the task performance of a person using the defensive pessimism strategy characteristically remains

unimpaired; indeed, the performance is often above-average (Garcia & Pintrich, 1994; Norem & Cantor, 1986). This strategy has important ramifications for self-regulated learning, as the motivation associated with high levels of cognitive engagement is typically depicted as having relatively lower performance concerns, high outcome expectancies, and low anxiety (e.g., Bandura, 1986; Dweck & Leggett, 1988; Schunk, 1991; Tobias, 1985). Defensive pessimism allows the individual to hold negative expectancies without debilitating performance, which counters findings in expectancy-based research (e.g., Atkinson & Birch, 1970; Bandura, 1982, 1986; Feather, 1982). Consequently, this motivational strategy emphasizes the complexity of the relationships between anxiety, expectations, and performance (Cantor & Norem, 1989; Garcia & Pintrich, 1994; Norem & Cantor, 1986).

In contrast, self-handicapping involves the withdrawal or decrease in effort to strategically maximize one's sense of self-worth (Baumeister & Scher, 1988; Covington, 1992; Garcia & Pintrich, 1994; Rhodewalt, Morf, Hazlett, & Fairfield, 1991). Students who engage in this particular strategy are painfully aware of the perceived link between effort and ability: that "smart" students do not have to try particularly hard to do well (Nicholls, 1989). Accordingly, by strategically regulating effort expenditure, self-handicapping enables the student to make self-serving attributions no matter what the task outcome. That is, by engaging in dilatory behavior or reducing effort, failure may be attributed to low effort rather than to low ability or incompetence; conversely, in the event of a success, the individual may bask in attributions of exceptional ability (Baumeister & Scher, 1988; Garcia & Pintrich, 1994). The implications for self-regulated learning are clear: low levels of cognitive engagement may be due to attempts to maintain one's sense of self-worth, not simply because of lack of knowledge of appropriate learning strategies. With regard to motivational factors, maintaining one's sense of self-worth may be considered a competing concern, overriding one's intrinsic value for a task, or one's efficacy, or one's anxiety about performance outcomes (Garcia & Pintrich, 1994).

Accordingly, the research questions to be addressed in this study are directed toward establishing empirical links between: motivational outlook (specifically, goal orientation, self-efficacy, and anxiety); motivational strategies (defensive pessimism and self-handicapping); cognitive engagement (rehearsal, elaboration, metacognitive regulation, and time and study management strategies); and achievement (GPA and course grade). The specific research questions are as follows. First, how do students who differ in level of use of motivational strategies differ in motivational outlook, cognitive engagement, and performance? Second, can students who vary in their motivational outlook, cognitive engagement, and performance, be distinguished by the levels of defensive pessimism and self-handicapping in which they engage? The first question addresses initial group differences in self-regulated learning and performance, while the second question addresses external validation of group differences in self-regulated learning and performance.

Method

Subjects

Participants were 126 college students enrolled in an introduction to educational psychology course at a large southwestern research university. Women comprised 49% of the sample (n = 62), and ethnic minorities constituted 39% of the sample (n = 49, mostly African-American (n = 21) and Latino (n = 20), and the remaining students of Asian or East Indian background). Subjects participated in this study to fulfill their class research requirement. The survey instrument was administered approximately six weeks into the Spring 1994 semester.

Measures

Motivation and learning strategies were measured by students' self-reports to the Motivated Strategies for Learning Questionnaire (MSLQ: Pintrich, Smith, Garcia & McKeachie, 1993). Four aspects of student motivation were examined: intrinsic and extrinsic goal orientation; self-efficacy; and test anxiety. Several types of learning strategies were used as indicators of cognitive engagement: rehearsal; elaboration; metacognitive regulation (planning, monitoring, regulating); and time and study environment management.

Two widely used measures of defensive pessimism (Norem & Cantor, 1986) and self-handicapping (Strube, 1986) were included in the survey instrument. Two forms of the two motivational strategy variables were used in this study: the original continuous measures, and the recoded categorical measures. The categorical versions of defensive pessimism and self-handicapping split the sample into low, moderate, and high groups, as defined by the bottom 10% (i.e., 10th percentile), the middle 80%, and the top 10% (i.e., 90th percentile) of each distribution. We used these conservative cut points in order to take into account the fact that many of us, at one point or another, use defensive pessimism or self-handicapping (e.g., it has been estimated that 70% of college students are procrastinators, Ellis & Knaus, 1977). The top and bottom deciles allowed us to examine these motivational strategies in their most "concentrated" and most "dilute" forms. Internal reliabilities as measured by Cronbach's alpha were acceptable, ranging from .64 to .87. The MSLQ and motivational strategies scales range from 1 to 7 (1=not at all true of me to 7=very true of me).

Grade point averages and final course grades were obtained from university records; achievement was measured according to the traditional 0 to 4.0 scale. Note: this particular institution does not use the plus or minus to modify the letter grades; students receive the B instead of the B- or the B+, for example. Descriptive statistics for the measures used in this study are located in Table 1.

Analyses

Oneway analysis of variance (ANOVA) with post hoc Neumann-Keuls tests were used to test group differences. Cluster analyses and multivariate analysis of variance (MANOVA) were then carried out in order to examine multivariate relationships among the constructs. Two cases were

deleted from the analyses because of extreme scores (i.e., these cases emerged as singletons in the cluster analyses), therefore the results below have been calculated on an n of 124.

Results

ANOVAs and post hoc tests

While self-handicapping was significantly related to lower levels of intrinsic goal orientation, learning strategies, and achievement, interestingly, defensive pessimism was significantly related only to test anxiety (see Table 2). Students who were high in defensive pessimism did not differ from the mid- and low groups except in their levels of test anxiety; students who were high in self-handicapping scored lowest in all measures except extrinsic goal orientation and test anxiety. These results are intriguing, for despite the fact that defensive pessimism is characterized by high levels of worry, students who rely on this strategy do not demonstrate the impairments we witness in students who are classically test anxious. That is, students who report high levels of defensive pessimism do not seem to conform to the cognitive skills deficit model of anxiety (Tobias, 1985), nor to the interference at the preprocessing/processing/ output stage model identified by Naveh-Benjamin, McKeachie, & Lin (1987). Our data here suggest that anxiety can indeed be used to provide the impetus for cognitive engagement (cf. Norem & Cantor, 1986). The fact that self-handicapping was related to significantly lower levels of intrinsic motivation, cognitive engagement, and achievement highlights the importance of affective concerns (in this case, protecting one's self-worth) in learning, motivation, and achievement.

Cluster analyses and MANOVAs

In order to demonstrate the validity of defensive pessimism and self-handicapping in a multivariate setting, we then used cluster analysis to create groups based on their motivation, learning strategies, and GPA. To provide external validation of the group differences, the clusters produced were then compared on their levels of motivational strategies and their performance in the class. MANOVA was then used to obtain multivariate tests of significance, to further confirm the results of the cluster analyses.

Cluster analyses using MacQueen's k-means clustering method and squared Euclidean distances produced a five-cluster solution in which the five groups differed significantly on the clustering variables (intrinsic and extrinsic goal orientation, self-efficacy, test anxiety, rehearsal, elaboration, metacognitive regulation, time & study environment management, and GPA). The five-cluster solution was chosen because it was the first solution to produce significant differences on all criterion variables, and solutions with more than five clusters produced cells with ns as small as 2. Univariate group differences are reported in Table 3.

Clusters 3 and 4 had the highest average GPAs, and were distinguished from one another by the fact that cluster 4 students were higher in test anxiety, metacognitive regulation and resource

management than cluster 3 students. If clusters 3 and 4 can be thought of as the motivated, cognitively engaged high achievers, cluster 1 can be thought of as the average achievers, with moderate levels of motivation, cognitive engagement, and achievement. We have labeled cluster 2 as the defensive pessimists and cluster 5 as the self-handicappers, as the external validation of cluster differences show that these two groups were highest in their respective motivational strategy scores. The defensive pessimists were comparable to clusters 3 and 4 in terms of achievement, intrinsic and extrinsic goal orientations, use of rehearsal strategies, and time and study environment management, but were markedly higher in anxiety and moderately lower in use of elaboration and metacognitive regulatory strategies. Cluster 5, the self-handicappers, reported the lowest levels of cognitive, metacognitive, and resource management strategies, were least intrinsically motivated for the course, and had the lowest achievement of the five groups.

The five-cluster solution was supported in multivariate tests of significance provided by MANOVA. Using the five groups as the categorical grouping variable and the cluster variables (intrinsic and extrinsic goal orientation, self-efficacy, test anxiety, rehearsal, elaboration, metacognitive regulation, time & study environment management, and GPA) as the multiple dependent variables, Pillai's trace was 1.77 (approximate $F(36,448) = 9.87$, $p < .001$); Hotelling's trace was 5.86 (approximate $F(36,430)=17.49$, $p < .001$). The five groups also differed significantly in a MANOVA with defensive pessimism, self-handicapping, and course grade as the multiple dependent variables (Pillai's trace = .55, approximate $F(12,351)=6.63$, $p < .001$; Hotelling's trace = .75, approximate $F(12,341)=7.08$, $p < .001$).

Discussion

The results presented above clearly demonstrate two points. First, that students who differed in their levels of motivational strategies (defensive pessimism and self-handicapping) differed in their levels of motivation, cognitive, metacognitive, and resource management strategies, and achievement. Second, that groups of students identified as differing in their levels of motivation, cognitive, metacognitive, and resource management strategies, and GPA were also distinguishable by their levels of defensive pessimism, self-handicapping, and course performance.

The use of these motivational strategies by students highlights the complexity of "self-regulation" and suggests that perhaps we should expand our notions of what self-regulation is. That is, we need to consider that the idealized portrait of a self-regulated learner that has developed over the past decade or so of research depicts the "good" learner, and that students who do not conform to this idealized vision may still be regulating their learning. The common definition of a self-regulated learner is a learner who is motivationally and cognitively engaged in achievement-related tasks (e.g., Zimmerman, 1994). Given this meaning, can we fairly say that students who engage in "self-perturbing ideations" (Bandura, 1986) to increase their efforts (in the case of defensive pessimism) are not

regulating their behavior? Can we legitimately claim that students who are aware that effort is a "double-edged sword" (Covington & Beery, 1976), and who then engage in dilatory behaviors in an attempt to protect their self-worth (in the case of self-handicapping) are not regulating their behavior? Our position here is that motivational strategies are yet another facet of self-regulation: these students are indeed active participants in their own learning process, despite the fact that the use of these strategies is not without certain costs, and that motivational strategies certainly do not operate in the same manner as previous depictions of self-regulated learning (cf. Zimmerman, 1994).

Accordingly, to fully understand "self-regulated learning" we must examine both the students who show high and the students who show low levels of cognitive engagement (cf. Garner, 1990). Adding motivational strategies to our models of self-regulated learning may be a way of gaining a greater insight into the achievement of high-anxious students, minority students, and of students labeled "at-risk." That is, these students' affective concerns may be taking precedence over the demands of a learning task; these students instead may be engaging in motivational strategies which may increase effort and cognitive engagement, as in the case of defensive pessimism, or decrease effort and cognitive engagement, as in the case of self-handicapping. As educators concerned with the motivational bases and the strategic aspects of learning, we must attend to the many demands students face in order to fully understand the "whys" and "hows" of students' learning. We should not neglect the fact that there are not only cognitive, but also affective outcomes related to the learning process; the stark reality of the educational system as it stands shows that being in school not only means trying to learn, but also being evaluated. Strategies such as defensive pessimism and self-handicapping are a means of anticipating and preparing for possible negative outcomes, and the data presented in this paper indicate that the use of these motivational strategies is indeed related to motivation, cognition, and achievement. The results presented here suggest that students' regulation of their learning not only involves regulation of the encoding process and cognitive outcomes, but also the regulation of affective outcomes.

The links between motivational strategies, motivational outlook, cognitive engagement, and performance certainly have implications for instructional practice. As Garner (1990) points out, we must consider the settings in which learners find themselves in order to understand differences in the use of learning strategies. In the same vein, we must examine the links between different classroom contexts and the use of these motivational strategies. While we have made the argument that motivational strategies are indeed an aspect of self-regulation, these are strategies that we certainly would not want to encourage amongst our students. The lower levels of achievement associated with self-handicapping and the high anxiety associated with defensive pessimism are by no means positive outcomes of schooling: however, the use of these strategies does exist, and the next step should be to identify the conditions under which these strategies are elicited. We have gathered new data since conducting this study, and our preliminary results indicate that higher levels of defensive pessimism

and self-handicapping are found in classrooms which are perceived to be more competitive, ability-focused, and difficult. In addition, we suspect that certain classroom practices such as grading on a curve and unidimensional rather than multidimensional assessment (e.g., a course where one's grade is based on four multiple choice tests vs. a course where one's grade is based on two papers, a multiple choice exam, and a group project) would engender high levels of defensive pessimism and self-handicapping. Of course, these are speculations, and systematic research is certainly needed to lend empirical evidence for these hypotheses. By examining how motivational strategies are related to different classroom structures, just as how students' goal orientation and task, classroom and school-level structures have been studied (Ames, 1992; Blumenfeld, Mergendoller, & Swarthout, 1987; Maehr & Midgley, 1991; Meece, Blumenfeld, & Hoyle, 1988), we may then be able to collaborate with and inform teachers as to how to best promote positive motivational beliefs and cognitive engagement. Identifying the contextual factors which might evoke the use of these motivational strategies is certainly be one of the main objectives of our research program.

Another important issue to address here is developmental differences in the use of motivational strategies. There may indeed be a developmental trend in the use of motivational strategies: since these strategies rest on fairly complex cognitive and affective processes, we may not find students in the elementary grades engaging in these strategies at all. Previous work has shown defensive pessimism and self-handicapping being used by adolescents in middle school (Garcia & Pintrich, 1993), but we are not aware of any research using younger participants. The well-documented shift in self-concept, self-esteem, and motivation between elementary and middle school (Eccles and her colleagues) may provide future researchers with a benchmark from which to begin tracing the development of motivational strategies.

Within the context of learning and achievement, consideration of both cognitive and motivational components is crucial (Pintrich, 1989). The results presented here suggest that "self-regulation" is more complex than previously believed, since motivational strategies seem to moderate the cognition-motivation interface, and that affect is a critical factor in student learning, motivation, and achievement.

References

Ames, C. (1992). Classrooms: Goals, structures, and student motivation. Journal of Educational Psychology, 84, 261-271.

Atkinson, J., & Birch, D. (1970). The dynamics of action. New York: Wiley.

Bandura, A. (1982). Self-efficacy mechanism in human agency. American Psychologist, 37, 122-147.

Bandura, A. (1986). Social foundations of thought and action: A social-cognitive theory. Englewood Cliffs, NJ: Prentice-Hall.

Baumeister, R.F., & Scher, S.J. (1988). Self-defeating behavior patterns among normal individuals: Review and analysis of common self-destructive tendencies. Psychological Bulletin, 104, 3-22.

Blumenfeld, P. C., Mergendoller, J. R., & Swarthout, D. W. (1987). Task as a heuristic for understanding student learning and motivation. Journal of Curriculum Studies, 19, 135-148.

Cantor, N., & Norem, J.K. (1989). Defensive pessimism and stress and coping. Social Cognition, 7, 92-112.

Covington, M.V. (1992). Making the grade: A self-worth perspective on motivation and school reform. New York: Cambridge University Press.

Covington, M.V., & Beery, R.G. (1976). Self-worth and school learning. New York: Holt, Rinehart & Winston.

Dweck, C.S., & Leggett, E.L. (1988). A social-cognitive approach to motivation and personality. Psychological Review, 95, 256-273.

Ellis, A., & Knaus, W.J. (1977). Overcoming procrastination. New York: Signet.

Feather, N.T. (1982). Actions in relation to expected consequences: An overview of a research program. In N.T. Feather (Ed.), Expectations and actions: Expectancy-value models in psychology (pp. 53-95). Hillsdale, NJ: Erlbaum.

Garcia, T. (in press). The role of motivational strategies in self-regulated learning. In P.R. Pintrich (Ed.), New directions for college teaching and learning: Self-regulated learning in the college classroom. San Francisco: Jossey-Bass.

Garcia, T., & Pintrich, P.R. (1993, April). Self-schemas, motivational strategies, and self-regulated learning. Paper presented at the annual meeting of the American Educational Research Association, Atlanta, GA.

Garcia, T., & Pintrich, P.R. (1994). Regulating motivation and cognition in the classroom: The role of self-schemas and self-regulatory strategies. In D.H. Schunk & B.J. Zimmerman (Eds.), Self-regulation of learning and performance: Issues and educational applications (pp. 127-153). Hillsdale, NJ: Erlbaum.

Garner, R. (1990). When children and adults do not use learning strategies: Toward a theory of settings. Review of Educational Research, 60, 517-529.

Maehr, M.L., & Midgley, C. (1991). Enhancing student motivation: A schoolwide approach. Educational Psychologist, 26, 399-427.

Meece, J. L., Blumenfeld, P. C., & Hoyle, R. H. (1988). Students' goal orientations and cognitive engagement in classroom activities. Journal of Educational Psychology, 80, 514-523.

Naveh-Benjamin, M., McKeachie, W.J., & Lin, Y.G. (1987). Two types of test-anxious students: Support for an information processing model. Journal of Educational Psychology, 79, 131-136.

Nicholls, J.G. (1989). The competitive ethos and democratic education. Cambridge, MA: Harvard University Press.

Norem, J.K., & Cantor, N. (1986). Defensive pessimism: Harnessing anxiety as motivation. Journal of Personality and Social Psychology, 51, 1208-1217.

Norem, J.K., & Illingworth, K.S.S. (1993). Strategy-dependent effects of reflecting on self and tasks: Some implications of optimism and defensive pessimism. Journal of Personality and Social Psychology, 65, 822-835.

Nuttin, J. (1984). Motivation, planning, and action. Hillsdale, NJ: Erlbaum.

Pintrich, P.R., Smith, D.A.F., Garcia, T., & McKeachie, W.J. (1993). Reliability and predictive validity of the Motivated Strategies for Learning Questionnaire (MSLQ). Educational and Psychological Measurement, 53, 801-813.

Rhodewalt, F., Morf, C., Hazlett, S., & Fairfield, M. (1991). Self-handicapping: The role of discounting and augmentation in the preservation of self-esteem. Journal of Personality and Social Psychology, 61, 122-131.

Schunk, D.H. (1991). Self-efficacy and academic motivation. Educational Psychologist, 26, 207-231.

Strube, M.J (1986). An analysis of the self-handicapping scale. Basic and Applied Social Psychology, 7, 211-224.

Tobias, S. (1985). Test anxiety: Interference, defective skills, and cognitive capacity. Educational Psychologist, 20, 135-142.

Weinstein, C. E., & Mayer, R. (1986). The teaching of learning strategies. In M. Wittrock (Ed.), Handbook of research on teaching and learning, (pp. 315-327). New York: Macmillan.

Zimmerman, B.J. (1994). Dimensions of academic self-regulation: A conceptual framework for education. In D.H. Schunk & B.J. Zimmerman (Eds.), Self-regulation of learning and performance: Issues and educational applications (pp. 3-21). Hillsdale, NJ: Erlbaum.

Zimmerman, B.J., & Schunk, D.H. (1989). Self-regulated learning and academic achievement: Theory, research, and practice. New York: Springer-Verlag.

BEST COPY AVAILABLE

Table 1

Descriptive statistics

Scale (number of items)	Mean	[SD]	Alpha
Motivation for Learning (scaled 1 to 7)			
Intrinsic Goal Orientation (4)	4.37	[1.03]	.64
Extrinsic Goal Orientation (4)	5.66	[0.91]	.65
Self-Efficacy (8)	5.87	[0.75]	.87
Test Anxiety (5)	3.67	[1.35]	.82
Motivational Strategies (scaled 1 to 7)			
Defensive Pessimism (4)	4.43	[1.09]	--
Self Handicapping (3)	5.31	[1.29]	.70
Cognitive, Metacognitive, and Resource Management Strategies (scaled 1 to 7)			
Rehearsal (4)	4.88	[1.18]	.65
Elaboration (6)	4.77	[1.06]	.79
Metacognitive Regulation (12)	4.42	[0.90]	.80
Time & Study Environment Mgmt. (8)	4.67	[0.94]	.74
Achievement (scaled 0.0 to 4.0)			
GPA	2.24	[0.73]	--
Final Course Grade	2.95	[0.85]	--

Table 2

Mean differences between groups

	Defensive Pessimism				Self-Handicapping			
	low (n=13)	mid (n=94)	high (n=19)	F ratio (2,123)	low (n=19)	mid (n=70)	high (n=37)	F ratio (2,123)
Motivation for Learning (scaled 1 to 7)								
Intrinsic Goal Orientation	4.47	4.31	4.38	.15	4.87a	4.36ab	4.04b	4.00*
Extrinsic Goal Orientation	5.40	5.58	5.86	.85	5.59	5.59	5.65	.05
Self-Efficacy	6.14	5.81	5.94	1.26	6.16	5.79	5.84	1.78
Test Anxiety	2.55a	3.72b	4.16b	6.29**	4.07	3.64	3.51	1.14
Cognitive, Metacognitive, and Resource Management Strategies (scaled 1 to 7)								
Rehearsal	5.08	4.79	5.12	.82	5.34a	5.12a	4.17b	11.23***
Elaboration	5.12	4.64	4.99	1.68	5.15a	4.81ab	4.41b	3.34*
Metacognitive Regulation	4.21	4.38	4.62	.86	5.03a	4.48b	3.93c	11.24***
Time & Study Env. Mgmt.	4.68	4.63	4.76	.17	5.68a	4.71b	4.01c	28.27***
Achievement (scaled 0.0 to 4.0)								
GPA	2.03	2.24	2.41	1.02	2.47	2.28	2.04	2.42+
Course Grade	2.69	2.99	2.95	.69	3.42a	3.01a	2.58b	7.03***

Note. Cut-offs for the low and high groups were at the 10th and 90th percentiles. Statistical significance is denoted as: + $p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$. Means with different subscripts are significantly different at alpha = .05 (post hoc Neumann-Keuls tests).

Table 3

Differences between cluster groups defined by motivation for learning, cognitive, metacognitive, and resource management strategies, and GPA

	Cluster 1 (n = 41)	Cluster 2 (n = 39)	Cluster 3 (n = 13)	Cluster 4 (n = 21)	Cluster 5 (n = 10)	E ratio (4,119)
Group differences in variables used to define groups:						
Motivation for Learning (scaled 1 to 7)						
Intrinsic Goal Orientation	4.01a	4.56b	4.85b	4.92b	3.39a	7.37***
Extrinsic Goal Orientation	5.36b	6.19a	5.88ab	5.19b	5.55ab	7.44***
Self-Efficacy	5.76a	5.86a	6.43b	6.23b	4.89c	9.59***
Test Anxiety	3.25a	5.08b	1.85c	3.12a	3.38a	45.22***
Cognitive, Metacognitive, and Resource Management Strategies (scaled 1 to 7)						
Rehearsal	4.11a	5.28b	5.57bc	6.00c	3.18d	34.44***
Elaboration	4.54a	4.63ab	5.24c	6.04d	3.03e	30.57***
Metacognitive Regulation	4.02a	4.44b	4.85c	5.56d	3.06e	35.72***
Time & Study Environment Mgmt.	4.41a	4.73b	4.80ab	5.76c	3.01d	30.46***
Achievement (scaled 0.0 to 4.0)						
GPA	2.17a	2.29a	2.48ab	2.43a	1.65b	2.60*
External validation of group differences :						
Motivational Strategies (scaled 1 to 7)						
Defensive Pessimism	4.42a	4.98b	3.42c	4.07ac	4.35abc	6.93***
Self-Handicapping	5.84a	5.08b	5.10bc	4.33c	6.43a	8.76***
Achievement (scaled 0.0 to 4.0)						
Course Grade	2.80a	3.11a	3.23a	3.33a	1.6?b	9.04***

Note. Significance levels for E statistics are denoted as follows: + $p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$. Means with different subscripts are significantly different at alpha = .05 (post hoc Neumann-Keuls tests).

BEST COPY AVAILABLE

Table x

Zero-order correlations between motivation for learning, cognitive, metacognitive, and resource management strategies, and motivational strategies

	1	2	3	4	5	6	7	8	9	10	11
1. Intrinsic Goal Orientation											
2. Extrinsic Goal Orientation	.10										
3. Self-Efficacy	.33	.08									
4. Test Anxiety	.06	.21	-.26								
5. Defensive Pessimism	-.11	.17	-.17	.48							
6. Self-Handicapping	-.27	.07	-.17	-.14	.10						
7. Rehearsal	.28	.10	.22	.10	-.05	-.36					
8. Elaboration	.36	.04	.45	-.23	-.18	-.24	.49				
9. Metacognitive Regulation	.45	-.10	.47	-.13	-.07	-.43	.46	.67			
10. Time & Study Mgmt.	.27	-.03	.38	.02	-.09	-.63	.48	.50	.67		
11. GPA	.03	-.13	.07	-.03	.05	-.21	.27	.11	.19	.13	
12. Course Grade	.11	-.04	.37	.00	-.02	-.33	.39	.29	.42	.42	.42

Note. Given a sample size of 124, correlations whose absolute values are greater than or equal to .18 are significant at alpha = .05; correlations whose absolute values are greater than or equal to .22 are significant at alpha = .01 (2-tailed tests).

BEST COPY AVAILABLE